

A FOLDABLE MOSQUITO-FREE PATIO

Mosquito net normally is used for covering windows and doors or in arrangements where net enclosing a sleeping place may be lifted up during the daytime when it is not needed.

In the present invention the net is utilized as walls and roof in an inexpensive patio structure that in effect expands the living-, working- and possibly sleeping area of the house, and may be folded up against the outer wall when not in use.

The structure opens up for the outdoor experience of the evening and night without use of more or less effective and poisonous mosquito balsam, smoke or the like.

In the daytime the patio may possibly remain unfolded as protection against the flies.

Futhermore the roof of the structure may be supplemented with sun- and/or rainproof fabric, so that it can act as protection against sun or rain.

For illustration of an example of design of the patio, in the drawing

Fig. 1 is a cross-section of the patio perpendicular to the outer wall (1) which constitutes one of the four walls of the patio,

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Fig. 2 is a facial view of the patio folded up against (1),

Fig. 3 is a facial view of a detail of hydraulic control of the structure,

Fig. 4 is a cross-section taken along the line I-I in Fig. 3,

Fig. 5 is a cross-section of a spring of plastic (32) in partly stretched condition of spring and net (2),

Fig. 6 is a facial view along the line II-II in Fig. 5,

Fig. 7 is a stylized cross-section of a structure that is modified because of lack of space.

In unfolded condition, Fig. 1, the mosquito net (2) constitutes roof and three of the walls of the patio.

The net is supported and stretched out by frames of profiles (3), (4) and (11), for instance of aluminium. The frames may be closed or interrupted at the foot for completely unhindered passage through the door (19), Fig. 2.

In the latter case the lower part of the frames may consist of horizontal concentric pipes (5) that can rotate around each other in the pipe-shaped mantle (6) fastened by means of mountings (7) to wall and floor.

The innermost pipe (5) extends beyond the inner end of (6) and holds all of the frames in place by means of cross bolts.

In folded condition the net (2) is rolled up on a horizontal (9) and two vertical (10) spring-driven rolls.

The edge of the net in (9) is fastened to the horizontal profile (19) in the frame (11). The frames are mutually connected with rope (12).

When the frame (11) turn downward around (6), the net is drawn

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along from (9), and subsequently the other frames (3) and (4) by the rope (12).

The space in front of the wall (1) allowing for it, the frame (11) is moved all the way down to the floor, and (19) is possibly tethered in the floor, so that the spring of (9) will not pull it back.

Alternatively the spring of (9) is locked in this position. Considering this alternative it may be practical to let the roll (9) make up the profile (19) and fasten the other end of the net to the wall.

Thereafter the two vertical nets in (10) may be rolled out and fastened to the net from the roll (9) and/or the frames (3), (4) and (11), for instance by means of a patented Velcro-like system, where the net is pressed down over a tape of plastic with upward hooks corresponding to the mesh width of the net.

The manual unfolding and folding of the structure may be mechanized for example by means of mutually connected motors (18), Fig. 2, that can rotate the pipes (5) and thereby the frame (11) 90 degrees and lock it in an arbitrarily chosen position, for example by means of a worm.

The motors may be manually, electrically, hydraulically or pneumatically driven.

In an alternative design the un- and up-folding of the structure takes place by means of two hydraulic piston-

cylinders (13) that are mutually series-connected by pipes and hoses (14) connecting the lower end of one cylinder with the upper end of the other cylinder. For considerations of space the cylinders appropriately may be telescopic.

A motor- or hand-driven hydraulic pump (15) is hose- (17) connected with one of the cylinders (13) and drives the piston of this in one or the other direction. Through the hose (14) the

motion propagates to an equally large motion of the piston in the other cylinder (13). The handle (29) can be locked in any desired position.

To compensate for the "dead" initial folded position of the structure where the cylinders (13) as well as the frame (11) are vertical, Figs. 3-4, one side of the frame (11) is supplied with a longitudinal casing (21) with a slit (31) in which the end of the piston (23) is conducted by a gudgeon or roll (20), possibly via a connecting link (27) supplied with a stop (30).

Appropriately a console with sloping top side (22) is mounted on the wall in the plane of motion of the piston.

During its initial downward motion the volume of the piston or the console (22) will cause the frame (11) to become gradually pressed away from the wall

When the gudgeon or roll (20) reaches the end of the casing (21), it will be pressed down into the expansion (25) of the casing, and the change of angle between frame and piston will have been large enough for the piston to act directly on the frame and press it rest of the 90 degrees down to the floor.

By supplementing the roll (9) with another similar roll in place of the profile (19) and by appropriate exchange between the two rolls of one continuous

sheet consisting of sections of mosquito net, sun-tight cloth and transparent rain-tight cloth, respectively, the structure may also be used as protection against sun and rain, respectively.

For example, the whole sheet in the folded position of the structure may be rolled up on the roll (9) and the outermost layer of the roll consist of sun-tight cloth, the next layer of mosquito net and the innermost of transparent rain-tight material.

During the daytime the sun-tight section may be drawn out from the roll (9). Before dark this section by means of a handle on

the roll (19) is rolled onto this roll, so that the mosquito net is drawn out from the roll (9), and so on if it rains.

The roll (19) is not necessarily spring-driven but may be supplied with a toothed wheel and a hook for locking the rotation of the roll in arbitrarily chosen positions.

To avoid the manual fastening of the vertical mosquito nets (2) from the rolls (10) to the roof structure and also avoid tightening of all openings along the rolls (9) and (19), the nets in sides and roof may be joined to constitute one continuous tent fastened to the frames (3), (4) and (11), the rolls (9) and (10) being left out.

In stead of rectangular longitudinal section, the frames possibly may be rounded.

In the folded condition of the structure the nets thus will be folded in stead of rolled and therefore take up more room.

In order to manage the folded nets, facilities may be placed on the wall (1) for tethering by rope, cloth, or net, or longitudinal hinged or spring-driven flaps over each one of the three folded nets for fastening, compression and sun protection of the nets. The flaps possibly may be moved hydraulically by means of the cylinders 13.

Furthermore elastic material may be fastened to or woven into each one of the nets for contraction of the net. Specifically each of the two corners beteen sides and roof may be supplied with an elastic rope.

Alternatively the folding of the nets may be controlled by means of springs (32) fastened to the net, Figs. 5-6.

The spring material may be plastic, for instance polypropylene. As shown in Fig. 6 the longitudinal direction of the individual springs (32) appropriately is oblique in relation to the direction of folding so that the total thickness of the spring in folded condition is minimal.

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In order to support the net (2) in the folded condition of the structure and also for raising and lowering of the structure, continuous ropes (12) may pass through eyes in the top of the frames (3) and (4) and via wheels on the wall (1) from both sides of the structure be conducted to the same drum on a hand- or motor-driven winch mounted on the wall (1).

For unfolding of the structure, springy or elastic elements, for example rubber bricks, may be mounted between the wall (1) and the foot of the frame (3) and mutually between the feet of the frames (3), (4) and (11).

Sun- and rain-protection may be achieved either by replacing the mosquito net (2) in for instance the outermost frame, in this case between the frames (4) and (11), by tight cloth, or by supporting this, possibly via a spring-driven roll (9) on the wall (1), on a separate hinged frame with same axis as, but outside the other frames.

If for example a terrace-wall (36) in front of the wall

(1), Fig. 7, prevents the end-profile (19) from moving all the way down to the floor, the frame (11) in either side may be provided with a hinge (35), so that the outer end of the frame, (37), can turn downwards to vertical position when the structure is unfolded.

A springy or elastic element, for instance a rubber brick, in the hinge (35) brings about the turning, and a stop at the underside of the hinge limits the turn.